SOIL VAPOR ASSESSMENT
SAMPLING PLAN
FORMER AL PHILLIPS FACILITY
MARYLAND SQUARE SHOPPING CENTER
3661 MARYLAND PARKWAY
LAS VEGAS, NEVADA

FOR AL PHILLIPS THE CLEANER

URS CORPORATION
JOB NO. 26698724.00005
JANUARY 24, 2007

URS

TABLE OF CONTENTS

FIGURES

1 INTRODUCTION

URS Corporation (URS) has prepared this Soil Vapor Sampling Plan (SP) at the request of Al Phillips the Cleaners, Inc. (Al Phillips) and at the request of the Nevada Division of Environmental Protection (NDEP). Al Phillips took over control of assessment activities at the site in 2004 from the Herman Kishner Trust. This SP addresses evaluation of tetrachloroethylene (PCE) in soil vapor primarily beneath the residential area between the eastern parking lot of The Boulevard Mall on the west and Spencer Street on the east. The purpose of this SP is to collect soil vapor samples in the study area, analyze the samples for potential PCE concentrations, collect soil samples for soil characteristic, and provide the analytical results to NDEP who will use the results to evaluate potential risk exposure to the public.

1.1 SITE LOCATION

The former Al Phillips facility is located in the Maryland Square Shopping Center at 3661 South Maryland Parkway, Las Vegas, Nevada (Figure 1). The soil vapor study area site is located between the eastern parking lot of The Boulevard Mall, west of Algonquin Drive and Spencer Street on the east (Figure 1).

1.2 PRIOR ASSESSMENTS

During 2005, Al Phillips performed a soil investigation at the former Al Phillips dry cleaning facility located on the west side of Maryland Parkway. During 2005 and 2006, eight groundwater-monitoring wells were installed in the residential area, which is the study area for this SP. Al Phillips has performed quarterly groundwater monitoring within the study area for the last two years. Groundwater monitoring results have shown that the dissolved PCE groundwater plume beneath the study area is approximately 400 feet (ft) to 450 ft. wide, is generally centered (east-west) along Seneca Lane, and extends both east and west of the study area for this assessment. The concentration of dissolved PCE in groundwater collected from the study area has ranged from 350 micrograms per liter (µg/L) to 2,500 µg/L. In general, the concentration of dissolved PCE is higher on the west side of the study area and decreases toward the east. Figure 2 is an aerial photo of the study area for the SP that shows the locations of the groundwater monitoring wells and the concentrations of PCE detected in groundwater collected during the December 2006 sampling event.

2 SITE SPECIFIC DATA

2.1 UTILITY LOCATION

During installation of groundwater monitoring wells within the study area, it was determined that underground utilities include sanitary sewer and natural gas. In general, sanitary sewer lines are located within the City Right-of-Way (ROW) along the residential streets. Gas lines in the study area do not always follow the ROW and vary in location. It is anticipated that underground utilities will not pose a problem during this implementation of this SP. A report of the results of this assessment will include a map of readily available utility location information as discussed in Section 3.6.

2.2 SITE GEOLOGY AND HYDROGEOLOGY

The site is located near the center of the Las Vegas Valley sedimentary basin. Based on installation of groundwater wells within the study area, the general stratigraphy within the study area includes hard fine sandy silt and one or more layer of firm to hard caliche. An attempt was made by Al Phillips during 2006 to perform direct-push groundwater sampling at the east end of the study area. This assessment failed due to shallow caliche encountered in the area. For this reason, the proposed sampling method will include drilling using an auger drill rig as discussed in Section 3. Based on December 2006 groundwater measurements in shallow monitoring wells within the study area, the depth to groundwater beneath the study area varies based on the local topography and subsurface conditions and ranges from approximately 11-ft. to 25-ft. below ground surface (bgs). Specifically, the depth to groundwater on the east side of The Boulevard Mall is approximately 25-ft. bgs, at the dead end cul-de-sac of Ottawa Drive at Algonquin Drive it is approximately 11-ft.bgs, and at the cul-de-sac on Ottawa Circle just east of the study area it is approximately 14 ft. bgs. Groundwater flow is toward the east at a general gradient of approximately 0.045-feet (vertical) per foot (horizontal).

3 SOIL VAPOR SAMPLING

3.1 PURPOSE AND SCOPE

The purpose of the scope of work (SOW) of this SP is to collect soil vapor samples in the study area, analyze the samples for potential PCE concentrations, and provide the analytical results to NDEP who will use the results to evaluate potential risk exposure to the public. The SOW will be accomplished by performing the following tasks:

- Drill six boreholes along a north-south line on the east side of the east parking lot of The Boulevard Mall. These boreholes will be drilled at intervals of approximate 66-ft. across the width of the dissolved PCE plume. These proposed locations are shown on Figure 2. Collect soil vapor samples at depths of 5-ft. and 10-ft.bgs, and just above groundwater.
- Drill four boreholes along an east-west line within the cul-de-sac ROW at the west end of Ottawa Drive just west of Algonquin Drive. This location is just at the west side of the residential area. These boreholes will be spaced as far apart as possible within the cul-de-sac. These proposed locations are shown on Figure 2. Collect soil vapor samples at depths of 5-ft. and just above groundwater.
- Drill six boreholes along a north-south line within the ROW median of Spencer Street. These boreholes will be drilled at intervals of approximately 66-ft. across the width of the dissolved PCE plume. These proposed locations are shown on Figure 2. Collect soil vapor samples at depths of 5-ft. and just above groundwater.
- Collect two-soil samples at each soil vapor sampling area (bullet items above).
- Submit soil vapor samples to a stationary analytical laboratory for analysis of PCE.
- Submit soil samples to a soil-testing laboratory for analysis of soil characteristics.
- Prepare a report for the soil vapor assessment and provide findings and results to NDEP for evaluation. The report will include the following:

    1. Description of sampling procedures, deviations from planned sampling, and difficulties encountered during sampling

    2. Site location map, sit plan including sample locations, groundwater monitor wells locations and the most recent groundwater analytical results, and groundwater concentration contours, a utility location map, and a map of soil vapor concentrations and possible soil vapor concentration contours

    3. Tables of soil vapor analytical results in micrograms per cubic meter ($\mu g/m^3$) and parts per billion vapor

    4. Copies of field data (borehole logs, etc.), analytical laboratory documentation including chain-of-custody (COC) forms, and geotechnical soil testing results.

3.2 RATIONALE AND SCOPE OF WORK

This section presents the rationale for selecting the location of boreholes, the depth and number of soil and soil vapor samples, and the method for analyzing soil and soil vapor samples.

3.2.1 Analytes of Concern

Based on the results of investigations performed by Converse and URS, the contaminant of concern is PCE. Soil characteristics of grain-size analysis, moisture content, bulk density, and grain density will also be considered to evaluate the nature of subsurface soils within the study area for use by NDEP in calculating potential risk exposure to the public.

3.2.2 Borehole Locations and Depths

Sixteen boreholes will be drilled at the locations specified in Section 3.1 (Figure 2). The locations of these boreholes have been selected to intercept the width of the dissolved PCE groundwater plume and to provide soil vapor data in the area where shallowest groundwater has been encountered. These boreholes will be numbered SVB-01 through SVB-16 and will be drilled using a truck/track-mounted hollow stem auger drill rig. Typically, soil vapor samples are collected using a direct-push drill rig. However, due to the presence of hard caliche across the study area, as encountered during groundwater well installation and a prior groundwater assessment by Al Phillips at the site, hollow stem auger drilling will be utilized. Boreholes will be drilled to the target soil vapor sampling depth (5ft. and 10ft. bgs. and just above groundwater) where soil vapor samples will be collected. Boreholes will be drilled so as not to encounter groundwater.

3.2.3 Soil Vapor Sampling

Soil vapor samples will be collected at 5-ft., 10-ft., and just above groundwater in the boreholes located on The Boulevard Mall property. Soil vapor samples will be collected at 5-ft. and just above groundwater in boreholes within the residential area. These samples will be collected to evaluate the variations in concentrations of PCE in soil at these depths. Boreholes will be logged by field personnel to characterize the subsurface lithology.

3.2.4 Soil Vapor Analysis

Soil vapor samples will be analyzed for VOC (specifically PCE, trichloroethylene, 1,2-dichloroethylene, and vinyl chloride) using U. S. EPA method 8260B using vapor standards. Detection levels of VOC will range from 100 $\mu g/m^3$ to 500 $\mu g/m^3$. A holding time of 24 hours will be requested from the laboratory. Selection of the analytical laboratory will be based on detection limits, holding times, and cost. The analytical results will be submitted to NDEP for evaluation.

3.2.5 Soil Sampling

Six soil samples will be collected during the soil vapor assessment. Two soil samples will be collected at each of the three vapor sampling areas. The selection of the depth that the six soil samples will be collected will be determined during drilling based on the geologic conditions encountered. These samples will be submitted to a soil-testing laboratory for analysis.

3.2.6 Soil Analysis

Soil samples will be analyzed for grain size, moisture content, bulk density, and grain density, by

American Standard for Testing and Materials (ASTM) standard D-422, D-2216, D-2937, and D-854. The soil testing data will be submitted to NDEP for evaluation.

3.3 FIELD METHODS AND PROCEEDURES

URS personnel will perform the field SOW following specific field methods and procedures. This section outlines the field equipment that will be used, discusses the soil vapor and soil sampling procedures that will be followed, presents the field documentation that will be performed, and describes sample documentation and transport.

3.3.1 Field Equipment

URS field personnel will have appropriate sampling materials and personal protective equipment onsite during the subsurface investigation. This shall include but not be limited to:

Paper towels	De-ionized water
Nitrile gloves	Alconox
Rotary-drive hammer	Disposable syringes
Soil vapor sampling rods	Firm ¼-inch OD nylon tubing
Retract-a-tip gas vapor probe	0.5L Tedlar bags
Sampling labels and seals	Soil sampling sleeve/rings and end caps
First aid kit	Chain-of-custody forms
Digital camera	Telephone
Dust Out (100% 1,1-difluoroethane)	Health and safety equipment

3.3.2 Underground Utility Clearance

Call Before You Dig will be notified approximately one week prior to performing field activities.

3.3.3 Soil Vapor Sampling

Soil vapor sampling will be performed at the specific sampling depths specified in Section 3.2.3. A truck/track-mounted hollow stem auger (HAS) drill rig will be used to drill the boreholes to a depth of 4-ft., 9-ft. bgs, and just above the vadose zone, just 1-ft above the target soil vapor sampling depth. A reusable soil vapor sampling probe will be attached to ¼-inch OD nylon sample tubing and the tubing and vapor probe will be attached to the drive rods. The drive rods will then be placed inside the hollow stem augers to the bottom of the borehole and a rotary-drive hammer will be used to drive the soil vapor sampling probe one more foot into the soil to the target sampling depth. Once the vapor probe is driven to the target sampling depth, a one foot thick slug of bentonite slurry will be placed inside the auger and the auger will be retraced one foot allowing the slurry to form a borehole seal above the soil vapor sampling probe. Disposable syringes will be used to purge three vapor volumes from the sampling tube, after which a soil vapor sample will be collected in 0.5-liter tedlar bags. The amount of vapor collected for each sample will approximately 500 cc. Once a vapor sample is collected, the Tedlar bag will be labeled and placed in a container to protect the sample from exposure to sunlight.

A tracer gas (1, 1-difluoroethan) will be utilized during the collection of soil vapor samples to ensure that the collected vapor sample is from the subsurface soil gas and not ambient air. Prior to

collecting a soil vapor sample a paper towel saturated with the tracer gas will be place on the ground where the tedlar sample bags are filled. All sampling equipment, including tedlar bags and sampling syringes, will be stored in a separate space from the tracer gas.

Tedlar bag samples will be numbered by borehole number, a dash, then the depth from which the sample was collected. For example, a soil vapor sample collected from 5-ft. bgs in Borehole SVB-01 would be labeled, SVB-01-05. Soil vapor samples will be labeled with the date and time the sample was collected, the sample and borehole number, and name of the firm and signature of the individual collecting the sample. A chain-of-custody from will be filled out with all the appropriate sample information and it will accompany the vapor samples to the analytical laboratory.

After collection of the soil vapor sample, the augers will be advanced to the next sampling interval and the sampling process will be repeated. This drilling and sampling procedure will continue until the correct number of soil vapor samples has been collected at each sampling location (SVB-01 through SVB-16). The total number of soil vapor samples proposed to be collected during this assessment is thirty-eight. It is anticipated that four additional Quality Control/Quality Assurance (QA/QC) vapor samples and several split samples will be collected during this assessment. Split samples will be collected by a State contractor. Boreholes will be backfilled to near ground surface using a neat cement grout or hydrated bentonite pellets and the borehole will be capped with 1-ft. to 2-ft. of concrete that is flush with the ground surface.

Excess soil from drilling and sampling will be placed in Department of Transportation (DOT)-approved 55-gallon drums. URS field personnel will label the drum identifying it as soil (non-hazardous) and will include the date, borehole number, firm, and signature of the URS personnel.

3.3.4 Soil Sampling

Two soil samples will be collected at each of the three vapor sampling areas. The depth that the soil samples will be collected in the boreholes will be selected by field personnel based on the geologic conditions encountered. The soil drive samplers, will be placed on the drive rod and lowered into the hollow stem auger. The drive head will then be advanced approximately 1.5 feet to 2 feet into the ground using an approximate 140-pound drive hammer. The sampling head will then be removed from the borehole and the soil samples will be taken from the sampling head.

The sleeved soil samples will be placed in containers for transport to the soil-testing laboratory. Soil samples will be numbered by borehole number, a dash, then the depth the sample was collected. For example, a soil sample collected from 6-ft. bgs in Borehole SVB-01 would be labeled, SVB-S1-06. Soil samples will be labeled with the date and time the sample was collected, the sample and borehole number, and name of the firm and signature of the individual collecting the sample.

3.3.5 Decontamination Procedures

The reusable soil vapor probe and drive rod will be decontaminated using an Alconox solution between samples. This measure will be taken as a precaution even though soil is not expected to be impacted by PCE. Decontamination of other sampling and drilling equipment will not be required during this assessment, as the soil in the study area is not contaminated with residual PCE and

drilling will not extend to groundwater. New sample tubing and syringes will be used every time a vapor sample is collected. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal.

3.3.6 Field Documentation

Field activities will be documented in writing and photographs taken. URS personnel will complete daily field logs, borehole logs, and chain-of-custody forms. Each daily field log will be dated and signed by URS personnel. Photographs will be taken to record field activities.

3.3.7 Sample Documentation and Shipment

Soil vapor samples will be labeled with the date and time the sample was collected, the sample number, location where the sample was collected, and name for the firm and signature of the individual collecting the sample. Tedlar vapor sample bags will be stored in a container to protect them from exposure to sunlight.

Chain-of-custody forms are used to document sample collection and shipment to laboratories for analysis. All soil vapor sample shipments for analyses will be accompanied by a chain-of-custody form. Form(s) will be completed and sent with the samples to the laboratory for each shipment. If multiple containers are sent to the analytical laboratory on a single day, form(s) will be completed and sent with each container. The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of URS personnel. URS field personnel will sign the chain-of-custody form in the "relinquished by" box and note date and time. The chain-of-custody form will be signed by the laboratory representative upon receipt.

3.3.8 Site Restoration

Areas of the work site that are disturbed or adversely impacted during the field investigation will be restored to conditions similar to original at the completion of field activities.

3.4 QUALITY CONTROL

The type and number of field quality control samples collected during the proposed investigation will be limited. Quality control samples consist of field duplicates, equipment or rinsate blanks, and trip blanks. Duplicate soil samples collected in the field provide precision information for the entire measurement system including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. The identity of duplicate samples is not revealed to the analysts and laboratory personnel. Duplicate samples are typically collected at a frequency of approximately 10 percent of the total investigative samples for each matrix.

Contamination of samples potentially introduced by reuse of equipment can be detected by means of analyzing an equipment or rinsate sample. Rinsate blanks are typically collected at a frequency of approximately 10 percent of the total investigative samples. Rinsate blanks consisting of the final rinse water are typically collected for non-disposable or non-dedicated sampling equipment after decontamination has been performed. Trip blanks are used to investigate the integrity of the

transport of samples to and from the laboratory. Typically, one trip blank per container per day is used.

Laboratory QA samples are called Laboratory Control Samples (LCS) and include method blank and matrix spikes. The LCS is based on the use of a standard, control matrix to generate precise and accurate data that are compared daily to the control limits. LCS information, in conjunction with method blank data, is used to assess daily laboratory performance. Matrix Spikes (MS) use an actual environmental sample to generate precision and accuracy that may be affected by the matrix. Typically, the MS is performed in duplicate as an MS/MS duplicate pair. MS/MS duplicate precision and accuracy information, supplemented with field blank results, are used to assess the effect of the matrix and field conditions on analytical data.

3.4.1 Duplicate Samples

The soil vapor SOW includes collection and analysis of four duplicate soil vapor samples during the assessment at the study area. These soil samples will be analyzed for VOC as specified in Section 3.2.4.

3.4.2 Rinsate/Equipment Blank

No Rinsate blanks will be collected during the soil vapor assessment.

3.4.3 Field Trip Blanks

It is anticipated the five to six trip blanks will be used and analyzed, as soil vapor sampling will occur over a period of several days and one blank will be required per day.

3.5 DISPOSAL OF RESIDUAL MATERIAL

The EPA's National Contingency Plan (NCP) requires that management of investigative-derived waste (IDW) generated during sampling activities comply with all applicable or relevant and appropriate requirements (ARARS) to the extent practicable. The SOW will follow the *Office of Emergency and Remedial Response (OERR) Directive 9345.3-02* (May 1991), which provides the guidance for the management of IDW. During the field activities, different types of IDW will be generated, including used personal protective equipment (PPE), disposable sampling equipment, and soil cuttings from soil boreholes.

Used PPE and disposable equipment will be double-bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal in the refuse dumpster.

Soil cuttings are anticipated to be non-hazardous and will be disposed of at a permitted disposal facility. Decontamination water used for cleaning the reusable soil vapor probe will be disposed of with the soil cuttings.

3.6 SOIL VAPOR ASSESSMENT SCHEDULE

The soil vapor SP will be submitted to the property owner for review and will be submitted to NDEP for review and approval. Once approved by NDEP, Al Phillips will perform the soil vapor SOW. The results of the assessment will be submitted to NDEP for evaluation of potential risk exposure to the public from the presence of the dissolved PCE plume in the study area. A report of findings, results, evaluation, conclusions, recommendation, or professional opinion will not be prepared by Al Phillips. The following schedule is proposed:

- Review and approval of the soil vapor SP by NDEP – January 19, 2007
- Implementation of soil vapor SP – January 31, 2007 or 20 days after approval by NDEP
- Submittal of analytical results to NDEP – within three days of receipt of results.
- Submittal of soil vapor sampling report to NDEP – within 30 days of receipt of analytical results.

4 QUALIFICATIONS AND SIGNATURES

This soil vapor SP was prepared by URS for Al Phillips and submitted to NDEP. The qualifications of the individuals involved in the preparation of this report are known to Al Phillips and NDEP.

Prepared by:

Scott Ball

Scott Ball, C.E.M.
Project Environmental Manager

Reviewed by:

Scott Ball for

Dennis Connair
Senior Technical Reviewer

4.1 CERTIFIED ENVIRONMENTAL MANAGER STATEMENT

The following statement is required by NDEP for Environmental Managers who practice in Nevada:

> *"I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein."*
>
> *I, Scott Ball, hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances.*

Scott Ball

_____

Scott Ball
Certified Environmental Manager No. 1316
(Expires October 15, 2007)

5 REFERENCES

Converse Consultants, 2000. Offsite Investigation, Maryland Square Shopping Center, Las Vegas, NV dated November 28, 2000.

-----, 2001. A through K Data Research Report, dated August 22, 2001.

-----, 2002a. Work Plan – Additional Site Investigation, dated January 11, 2002.

-----, 2002b. Additional Soil and Groundwater Investigation, dated November 13, 2002.

-----, 2003a. Additional Soil and Groundwater Investigation, dated May 16, 2003.

-----, 2003b. Preliminary Corrective Action Plan (CAP), dated June 27, 2003.

-----, 2003c. Work Plan – Additional Site Activities, dated September 12, 2003.

-----, 2003d. Groundwater Monitoring Report – 3rd Quarter 2003, dated October 31, 2003.

-----, 2004. Well Installation/Slug Testing/Groundwater Monitoring Report – 4th Quarter 2003 and 1st Quarter 2004, dated March 2004.

URS, 2004. Revised Work Plan, Proposed Subsurface Investigation, Former Al Phillips the Cleaner Site, Maryland Square Shopping Center, Las Vegas, NV, dated September 10, 2004.

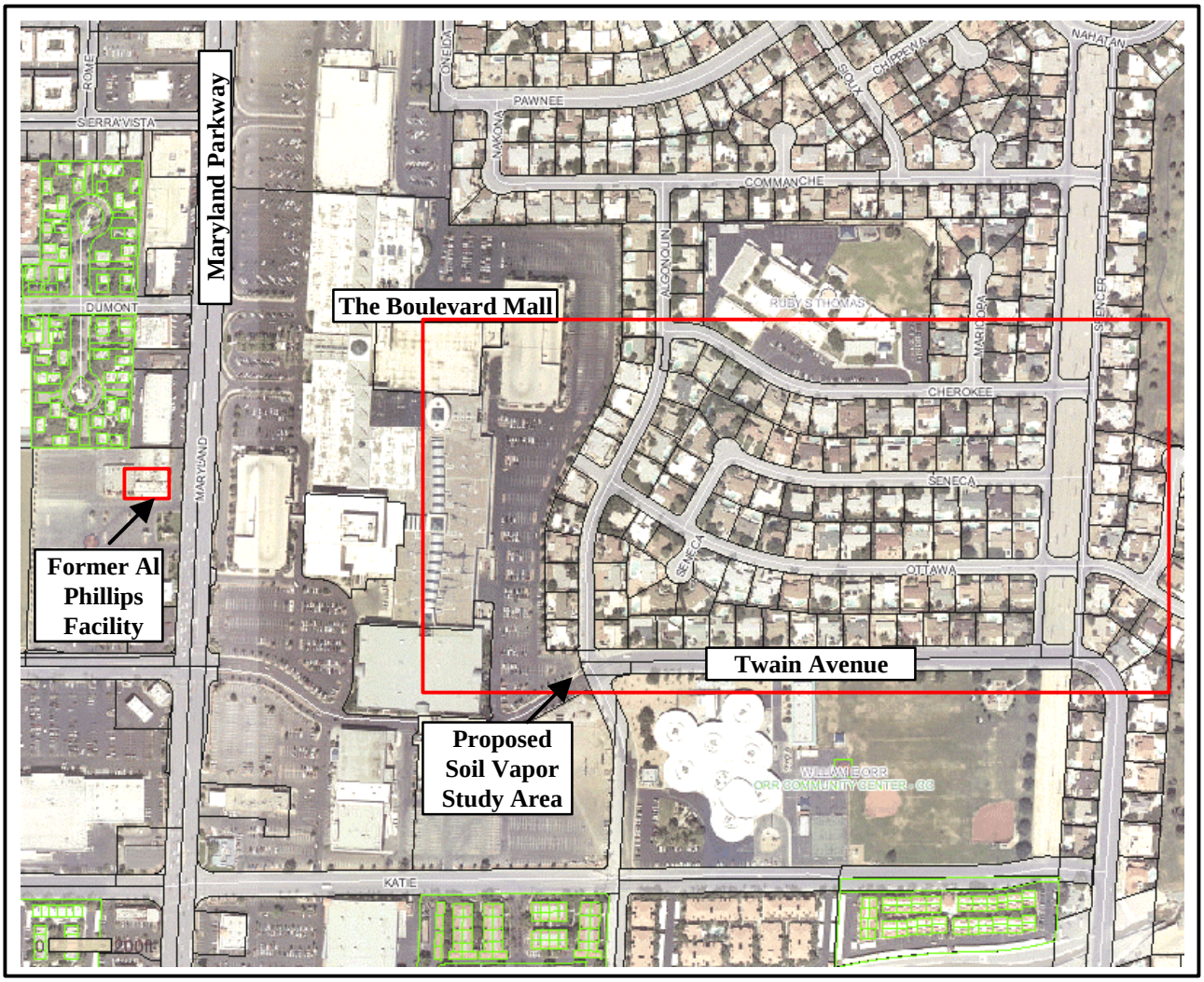
URS, 2005. Subsurface Investigation, Former Al Phillips the Cleaner Site, Maryland Square Shopping Center, Las Vegas, NV, dated July 11, 2005 .

URS, 2005. Quarterly Groundwater Sampling, Former Al Phillips the Cleaner Site, Maryland Square Shopping Center, Las Vegas, NV, dated September 26, 2005.

URS, 2005. Proposed Remedial Pilot Study, Former Al Phillips the Cleaner Site, Maryland Square Shopping Center, Las Vegas, NV, dated December 27, 2005.

6 FIGURES

Figure 1 Site Location Map
Figure 2 Groundwater PCE Concentrations and Proposed Locations of Soil Vapor Sampling



Source: Clark County Assessors Web Site
Scale: 200 feet

N

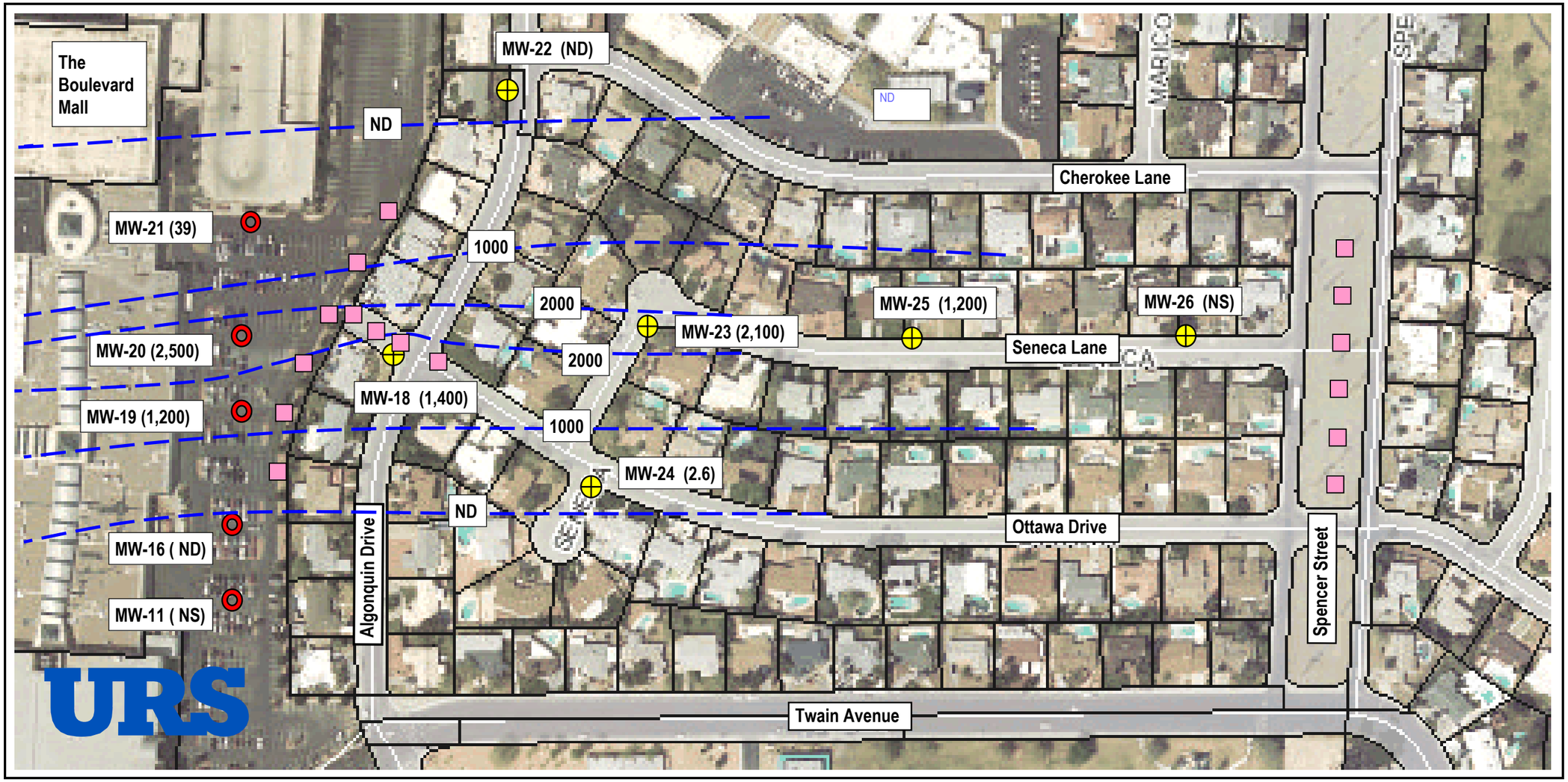
SITE LOCATION MAP

Soil Vapor Assessment
Al Phillips The Cleaner
Maryland Square Shopping Center
3661 South Maryland Parkway
Las Vegas, Nevada

URS

January 2007
Job No. 26698724

MS Soil Vapor Assessment Fig 1.ppt FIGURE 1



Source: Clark County Assessors Web Site
Scale: 0Feet 200 Feet

Legend:

- Approximate Location of Monitoring Well Installed by URS.
- Approximate Location of Monitoring Well Installed by Converse.
- (25) Concentration of PCE Detected in Groundwater Form Monitoring Well (in ug/L)
- Approximate Concentration Contour of PCE in Groundwater. ND is Non-detect, NS is Not Sampled
- Proposed Soil Vapor Sampling Location

N

GROUNDWATER PCE CONCENTRATIONS AND PROPOSED LOCATIONS OF SOIL VAPOR SAMPLING

Soil Vapor Assessment
Al Phillips The Cleaner
Maryland Square Shopping Center
3661 South Maryland Parkway
Las Vegas, Nevada

January 2007
Job No. 26698724
MS Soil Vapor Assessment Fig2.ppt

FIGURE 2